

Winter Foraging Plants of Domestic Sheep in Hulunbeir Grassland

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Abstract Winter food constitution and favorite level of domestic sheep were studied with the microhistological analysis technique of feces in Hulunbeir Grassland. Some problems were inquired into, such as the quality state of local herbage resource, improvement of pasture, rational use of herbage, etc. The results showed that the staple food of domestic sheep in winter was Gramineae, which made up 73.3 percent of the total foraging species. Fabaceae was second, 11.6 per cent. Composite took third place, 7.4 per cent. The proportion of other species were very small.

Key words: Hulunbeir grassland, Domestic sheep, Foraging plants

Introduction

At present, there are many methods to decide food constitution of herbivores, such as stomach analysis, feces analysis and direct observation. Someone also used esophagus fistula method to analyze.

Since 1970, feces analysis was widely used because of its easier sampling and its little disturbance to animal (Vavra et al, 1980; Norburg, 1988; Gao Zhongxin et al, 1991).

This method was also used in this study. The experimental material came from Xinbarhuyou, Hulunbeir, which lay between longitude 115° - 117°48' E and latitude 47°39' - 49°50' N. *Stipa. grandis* was the dominant species. *Aneurolepidium. chinese* pasture, however, occupied larger area.

Materials and Methods

Collection and section of consultable plant and feces

All species of plants should be collected in foraging habitat of domestic sheep, especially pay more attention to dominant species. Feces samples were complex, collected from the herd of domestic sheep. They came from

60 different places. In each place we got 30 samples. Date of the samples was from Nov. 1993 to Feb. , 1994.

Consultable plant epidermis and feces were dealt with same quantity of 10 % nitric and 10 % chromic acid first, then cut it into section. By this means, 15 microsections of epidermis and feces were made. Consultable analysis was made on the basis of the microsections of plants epidermis and feces.

Method and data processing

Feces microsections were analyzed with changing frequency method and examined by microscope magnifying 100 times. For each microsection we selected 20 unrepetition field of vision.

In each field of vision, oddments of identifying epidermis cuticle were recorded. Emerging frequency (F) was calculated. According to the formula: $F=100(1-e^{-D})$, we could gain the average density (D). D could be transformed into relative density (RD) based on the formula:

$$RD = \frac{DE}{SDE}$$

where:

DE is density of epiderm, which is cuticle oddments of each plant

SDE is sum of density of epiderm, which is cuticle oddments of each plant

RI was used to estimate the actual proportion of each foraging plant.

Conclusion and Discussion

From Table 1, we could conclude that in the winter food of domestic sheep, Gramineae plant was the staple food, made up 73.3 %, Fabaceae plant was less, 11.6 %, Composite took the third place, 7.4 %, other plants only made very small proportion (Table 2).

Table 1. Winter food constitution of domestic sheep

plant species	proportion	
Chenopodiaceae	<i>Kalidium foliatum</i>	T
Polygonaceae	<i>Polygonum aviculare</i>	T
Tamaricaceae	<i>Reaumuria soongerica</i>	T
Rosaceae	<i>Potentilla sp.</i>	2.3
	<i>Astragalus adsurgens</i>	T
Fabaceae	<i>Caragana microphylla</i>	6.7
	<i>Lespedeza daurica</i>	1.8
	<i>Meilolus suaveolens</i>	2.4
Rutaceae	<i>Haplophyllum dauricum</i>	T
Scrophulariaceae	<i>Pedicularis resupinata</i>	T
Compositae	<i>Artemisia oxycephala</i>	2.0
	<i>Artemisia frigida</i>	5.4
	<i>Achnatherum splendens</i>	T
	<i>Agropyron cristatum</i>	2.1
	<i>Aneurolepidium chinense</i>	28.4
	<i>Festuca sp.</i>	3.3
Gramineae	<i>Koeleria cristata</i>	4.3
	<i>Leucopoa albida</i>	1.3
	<i>Stipa sp.</i>	30.1
	<i>Clestogenes squarrosa</i>	3.5
Liliaceae	<i>Allium prostratum</i>	T
	<i>Allium senescens</i>	1.5
100	total	

*: T: means one foraging plant's percentage of all foraging plants.

Analyzing with clustering, we could classify winter food into two groups. One is *Kalidium foliatum*, *Polygonum aviculare*, *Reaumuria soongerica*, *Astragalus adsurgens*, *Haplophyllum dauricum*, *Pedicularis resupinata*, *Achnatherum splendens* and *Allium prostratum* ($G_1=T$). The other is *Leucopoa albida* ($G_2=1.3$), *Allium senescens* ($G_3=1.5$), *Lespedeza daurica* ($G_4=1.8$), *Artemisia oxycephala* ($G_5=2.0$), *Achnatherum cristatum* ($G_6=2.1$), *Potentilla sp.* ($G_7=2.3$), *Meilolus suaveolens* ($G_8=2.4$), *Pestuca sp.* ($G_9=3.3$), *Clestogenes squarrosa* ($G_{10}=3.5$), *Koeleria cristata* ($G_{11}=4.3$), *Artemisia frigida* ($G_{12}=5.4$), *Caragana microphylla* ($G_{13}=6.7$),

Aneurolepidium chinense ($G_{14}=28.4$), and *Stipa sp.* ($G_{15}=30.1$). Then we drew Fig. 1 with least distance method.

It was shown passing analysis of constitution that *Pestuca sp.* ($RI=30.1\%$) and *A. chinense* were all staple foods. *Caragana microphylla* ($RI=6.7\%$) was favorite foods.

Table 2. Proportion of each family of winter food of domestic sheep

Family	Proportion (%)
Chenopodiaceae	T
Polygonaceae	T
Tamaricaceae	T
Rosaceae	2.3
Fabaceae	11.6
Rutaceae	T
Scrophulariaceae	T
Compositae	7.4
Gramineae	73.3
Liliaceae	2.2
Total	$\Sigma=100$

Pestuca sp. and *A. chinense* were all staple foods, but the proportion of the first one was bigger than the second. The reason might have something to do with the dominant position, nutritive value and competition with other herbivores. The remain state of *Pestuca sp.* in Hulunbeir Grassland was better. Body of *A. chinense* was larger. It was second only to *Pestuca sp.* Its nutritive value was higher than *pestuca sp.*

Caragana microphylla belonged to Fabaceae. It was abundant and had a high nutritive value. Domestic sheep also foraged *Artemisia frigida* and *Koeleria cristata*. Expect staple foods and favorite plant, others rather had almost identical proportion.

In the winter food of domestic sheep, proportion of *Stipa sp.* was the highest, but its nutritive value wasn't the highest. It might indicate that the forging condition in Hulunbeir Grassland wasn't excellent. The phenomenon might relate to herds capacity, grassland degeneration and foraging competition of herbivores of local grassland. Because of not only means of management and employment, but also climate and endanger of rats, grassland of Hulunbeir had appeared to different degeneration. Its total area had reached 2.0972 km², made up 21.0 % of available area. Among them, the largest area of degeneration was the pasture in Xinbarhuyou, its total area was 5824 km², made up 28.9 % of its available grassland area. Proceeding from actual conditions, we should improve quality of grassland, herb sheep rationally, hold back the degeneration and increase herd ca-

capacity in order to gain more benefits.

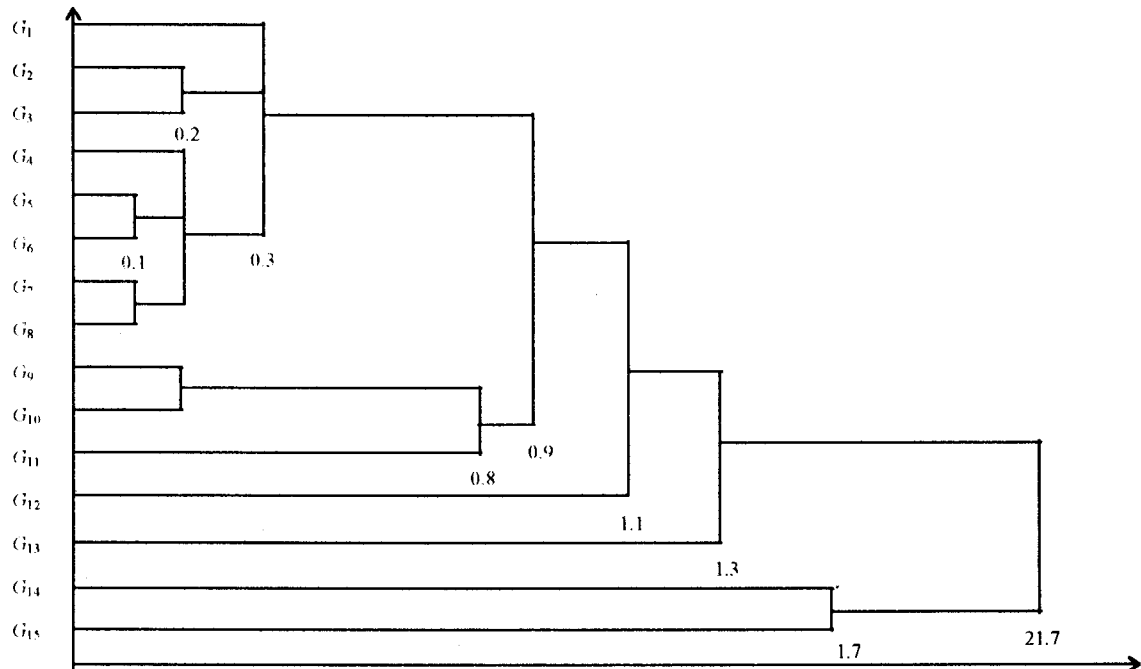


Fig. 1. The cluster of the winter diet composition of sheep

References

1. 中国农业科学院草原所. 1990. 中国饲用植物化学成分及营养价值表. 农业出版社.
2. 高中信等. 1991. 粪便分析法测定植食动物食性的评价. 兽类学报. 11(3):188-193
3. 潘学清等. 1992. 中国呼伦贝尔草地. 吉林科学技术出版社.

版社.

4. 陈化鹏等. 1993. 食草动物粪便分析法及其评价. 国土与自然资源研究. (4):61-62

5. Zhigang Jiang and Robert J. Hudson. 1994. Bite characteristics of wapiti (*Cervus elaphus*) in seasonal *Bromus-Poa* swards, *Journal of Range Management*, 47(2)

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